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SUPERCONDUCTIVITY OF BiNa

(Letter to the Editor)

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As the author reported in a previous article, "The Superconductivity of Bismuth Compounds" superconductivity was discovered in a number of alloys of bismuth with nonsuperconducting metals. Now another superconducting bismuth alloy has been found, a bismuth-sodium alloy of composition BiNa.

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The raw materials for preparing this alloy are "Jarel Asch" Bi and "Merck" Na. The alloy was prepared just as before by fusing it in a sealed-off quartz ampule and then annealing it. The alloy was made up from "Griffin Tatlock" Bi and "Merck" Na which gave the same results. The final samples were annealed for 2 days at 400 degrees centigrade. Superconductivity was determined by measuring the specimen's resistance and magnetic moment. Resistance was measured in a fragment of the alloy cut off from the large cylindrical bar 8 x 20 millimeters in size which was used to measure magnetic moment. The alloy sample used to measure magnetic moment was given the form of an ellipsoid, after which it was very carefully etched to remove any possible surface ferromagnetic impurities. Since the alloy reacts actively with water, the sample was etched in pure water. After a sufficient quantity of the sample had dissolved, the sample was repeatedly rinsed in alcohol and then dried and immediately put into the apparatus, which had been evacuated and filled with gaseous helium to prevent interaction with atmospheric moisture.

Unfortunately the sample had a considerable number of cracks, which caused hysteresis during measurement of the magnetic moment. The resistance curve, the curve showing magnetic moment versus external field, and the curve of critical field versus temperature were drawn. The critical field values for this graph

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are taken from the magnetic-moment measurements, the transition temperature according to this curve being 2.25 degrees K. The somewhat lower transition temperature as obtained from the resistance curve is probably explained by the greater inhomogeneity of the particular sample used for determining resistance. The value for dH_c/dT is approximately 100 gauss/degree. It should be noted, however, that the value dH_c/dT obtained from the resistance measurements is considerably higher and comes to 250 gauss/degree. It is probable that this difference is due to insufficient homogeneity of the alloy.

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